



2014 Israel
Wireless Charging for Wearable Devices
Technology Innovation Leadership Award



F R O S T & S U L L I V A N



50 Years of Growth, Innovation & Leadership

Technology Innovation Leadership Wireless Charging for Wearable Devices

Israel, 2014

Background and Company Performance

Industry Challenges

Wireless communication in consumer electronics has created a shift in the usage of electronic devices. With the increase in wireless electronics devices, there is a demand for better and more efficient ways of powering the devices compared to conventional solutions - such as batteries and cables. Frost & Sullivan notes that wireless charging is emerging as an attractive technology in the consumer electronics sector, as it has the capability to eliminate the need for cables and cords for charging and powering various consumer electronic devices. The concept of charging electronic devices without plugging them into the wall has led to the emergence of wireless charging. In wireless charging, any low-power device - such as a mobile phone or tablet - can be charged automatically by simply placing the device within range of the wireless power source. This eliminates the need for multiple power cords, transforming the currently available portable electronics devices into truly wireless solutions.

Despite these advantages, wireless charging technology has still not gained wide acceptance among end users. To enable widespread adoption of wireless charging in all types of electronic devices, Frost & Sullivan analysis indicates that capabilities such as high efficiency and ease of use have to be improved. The majority of wireless charging solutions available in the market requires the charging pad to be perfectly positioned before charging. Inductive technology is mainly used for wireless charging, whereby strong magnets are used to ensure the alignment. However, this leads to inconvenience, as the user cannot easily shift the charging device. Usage of these strong magnets also increases the manufacturing cost and the form factor of the wireless charging device. Frost & Sullivan feels that all of these factors have restricted the adoption of wireless charging in consumer electronics.

Visionary Innovation and Product Excellence

Commitment to Innovation

Israeli start-up Humavox has introduced radio frequency (RF)-based wireless charging technology that can transmit power wirelessly to mobile devices. Humavox's RF technology stands out from magnetic resonance and inductive charging techniques, as it is clearly easier to implement in mobile devices. There will be no longer the need for precise placement onto power-charging mats. The RF-based technology will create a natural experience for users to simply drop the mobile device - rather than having to place it on a pad in a precisely oriented manner.

Different from other wireless charging technologies that use magnetic induction or resonance, Humavox's technology is based on transferring electricity through radio waves (RF to RF).

The unique technology forms a system by which radio frequencies are transmitted and then picked up and converted into DC voltage in a highly efficient manner. Frost & Sullivan appreciates that the distinctive feature of this technology is that it doesn't need very close proximity or a flat charging surface to function efficiently.

Commitment to Creativity

The novel wireless charging technology from Humavox enables convenient and effortless charging of all types of mobile devices. In most wireless charging technologies, there is a wireless mobile device charging pad on which the device needs to be placed in perfect alignment to the magnet of the charging pad. This has proved to be a limitation as users, irrespective of age, aren't able to place their mobile device in a perfect orientation; this leads to inaccurate charging.

Based on RF harvesting, Humavox's technology includes a receiver, embedded in the device, and a transmitter placed inside the charging station. The user can simply drop the mobile device into the charging station and have it charged wirelessly, without caring about proper orientation issues. For end users, wireless charging becomes intuitive and effortless with this simple "drop and charge" solution. It can charge one or many devices at the same time in the same space. Virtually no difficult engineering and integration efforts are required in order to incorporate Humavox's technology.

Commercialization Success

Humavox has employed its novel RF-based wireless charging technology in a new wireless charging platform called Eterna. This platform can be integrated with most portable electronic devices to enable wireless charging. It consists of the Humavox NEST charging station, which charges electronic devices placed inside it with no placement orientation inhibitions and a wireless charging enabler, called ThunderLink, the receiver that is integrated in the electronic devices' power management integrated circuit (PMIC).

Humavox plans to sell its Eterna platform as intellectual property to device manufacturers who can easily integrate Humavox's wireless charging element into their mobile devices in the most efficient way possible.

The wireless charging technology has already gained considerable attention from the smartphones sector, while future advancements are expected to expand the application range to include laptops, tablets, home appliances, and many more. Humavox's wireless charging technology will take care of the needs of the next generation mobile computing devices. Apart from smartphones, Humavox has targeted wearable devices, such as hearing aids, activity monitors, fitness bands, smart-watches, and smart glasses.

Unmet Needs

Wireless charging in mobile electronic devices, such as smartphones, tablets, wearable devices, smart watches or smart glasses, has been quite limited, as most of the wireless charging systems arrive with a predefined industrial design. Humavox has created its wireless charging system with a design-free concept. The shape of the charging bowl can be customized and made of any shape and size.

Humavox's wireless charging system creates a confined charging space, efficiently controlling energy transfer by transmitting energy to the devices under charge. Multiple devices can be charged simultaneously.

Humavox's wireless charging system constantly monitors and adjusts the charging process for ultimate compliance with the device's power requirements. Humavox's approach to wireless charging is to create a design-free solution, so that OEMs can maintain their brand identity and decide the design of their proprietary charger.

Pioneering Best Practices

Humavox's mission statement is to "retire the wire," and its aim is to sustain the vision of the Internet of Things (IoT) and connected devices. In December 2013, the company launched its flexible wireless charging platform Eterna. With a highly specialized team focused on wireless charging, Humavox started to develop the smart wireless charging platform solution which is agnostic of the mobile devices' shape.

The patent portfolio protects Humavox's unique technology in today's competitive and fast-changing consumer electronics market. Frost & Sullivan research shows that this strategy also demonstrates the best practice of protecting market-driven development. Humavox has established its Eterna platform by closely monitoring user behavior and by reviewing the user's daily routine in the targeted markets. Humavox allows product designers and manufacturers instant access to wireless power, eliminating concerns over the battery-life of devices.

Humavox's RF-based wireless charging technology can be accessed and integrated in a rapid and agile way - without irrationally increasing the BOM cost for electronics manufacturers. Humavox's strategy is not to sell its Eterna platform as a product; instead, make it available for licensing as IP for OEMs to integrate and develop their own products. Humavox is already working with OEMs, and Eterna-enabled products are anticipated in the market by 2015.

Blue Ocean Strategy

The wireless charging for consumer electronics market is currently in the emerging stage. Though market adoption has been limited until now, there is significant potential for growth as the industry is successfully making inroads into the high-volume consumer electronics sector. The convenience attributed to wireless charging is significantly driving the adoption of the technology in wireless and mobile devices.

While most companies are focusing on smartphones or tablets, Humavox has targeted the wearable electronics and healthcare market, which encompasses hearing aids, fitness bands, activity monitors, and augmented reality (AR) glasses, such as Google Glass. This would create a new demand for wireless charging in the future.

Humavox aims to transform the traditional methods of charging electronic devices, and the company has spent over three years developing its novel RF-based wireless charging technology, which offers a seamless charging experience and a universal charging platform for all types of electronic devices.

Conclusion

Key opportunities for wireless charging are present in the consumer electronics market. Apart from the smartphone market, Humavox has also targeted the wearable device and healthcare market which hold high adoption potential for wireless charging. Humavox's RF-based wireless charging technology is poised to introduce simplicity to wireless charging at a critical time when the IoT is gaining momentum. The charging capability of Humavox's technology can easily match the power charging capability of a typical USB cord and can charge several devices at the same time.

Humavox's technology-enabled Eterna platform is based on RF charging, which is not (unlike competing methods) affected by device size or shape; this gives OEMs the liberty to integrate wireless power into their devices, without sacrificing device aesthetics or quality. Recognizing the innovative capabilities of Humavox's technology, Frost & Sullivan bestows the company with the 2014 Technology Innovation Leadership Award.

Significance of Technology Innovation Leadership

Ultimately, growth in any organization depends upon finding new ways to excite the market, and upon maintaining a long-term commitment to innovation. At its core, Technology Innovation Leadership is therefore about three key things: understanding demand, nurturing the brand, and differentiating from the competition.



Understanding Technology Innovation Leadership

Demand forecasting, branding, and differentiation all play a critical role in achieving growth through technology innovation leadership. This three-fold focus, however, is only part of the journey. Ultimately, technology innovation leadership begins with an idea: with a spark of creativity that is systematically pursued, developed, and commercialized.



Key Benchmarking Criteria

For the Technology Innovation Leadership Award, Frost & Sullivan analysts independently evaluated the total client experience and strategy implementation excellence according to the criteria detailed below.

Technology Excellence

- Criterion 1: Commitment to Innovation
- Criterion 2: Commitment to Creativity
- Criterion 3: Stage Gate Efficiency
- Criterion 4: Commercialization Success
- Criterion 5: Application Diversity

Visionary Innovation

- Criterion 1: Unmet Needs
- Criterion 2: Use of Mega Trends
- Criterion 3: Pioneering Best Practices
- Criterion 4: Blue Ocean Strategy
- Criterion 5: Aspirational Ideals

The Intersection between 360-Degree Research and Best Practices Awards

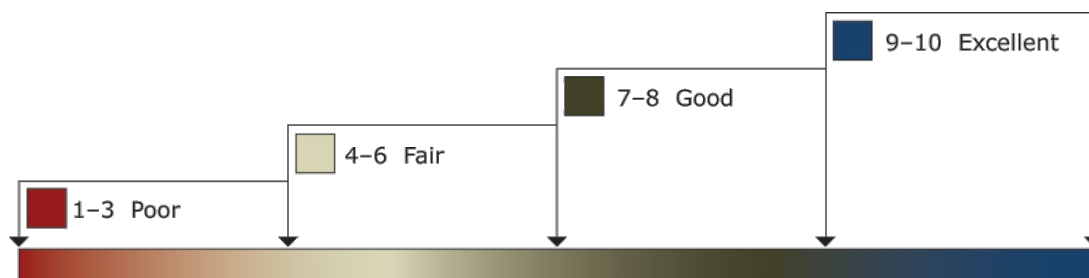
Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often, companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry players and for identifying those performing at best-in-class levels.



Decision Support Scorecard and Matrix

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard and Matrix. This analytical tool compares companies' performance relative to each other. It features criteria unique to each award category and ranks importance by assigning weights to each criterion. The relative weighting reflects current market conditions and illustrates the associated importance of each criterion according to Frost & Sullivan. This tool allows our research and consulting teams to objectively analyze performance, according to each criterion, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation; ratings guidelines are illustrated below.



Best Practice Award Analysis for Humavox

Decision Support Scorecard: Technology Excellence

The Decision Support Scorecard illustrates the relative importance of each criterion and the ratings for each company under evaluation for the Technology Innovation Leadership Award. The research team confirms the veracity of the model by ensuring that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

Finally, to remain unbiased and to protect the interests of all organizations reviewed, we have chosen to refer to the other key players in as Company2 and Company3.

Decision Support Scorecard for Technology Innovation Leadership Award (Illustrative): TECHNOLOGY Excellence

<i>Measurement of 1–10 (1 = poor; 10 = excellent)</i>	Award Criteria					
	Commitment to Innovation	Commitment to Creativity	Stage Gate Efficiency	Commercialization Success	Application Diversity	Weighted Rating
Technology Excellence						
Relative Weight (%)	20%	20%	20%	20%	20%	100%
Humavox	9.0	9.0	9.0	9.5	9.0	9.1
Company2	8.0	8.0	8.0	7.5	8.0	7.9
Company3	7.5	7.0	7.5	7.0	7.0	7.2

Criterion 1: Commitment to Innovation

Requirement: Conscious, ongoing development of an organization culture that supports the pursuit of groundbreaking ideas

Criterion 2: Commitment to Creativity

Requirement: Employees known for pushing the limits of form and function, and who are unafraid to pursue “white space” innovation

Criterion 3: Stage Gate Efficiency

Requirement: A process that moves creative, groundbreaking concepts quickly and profitably from early-stage investments to late-stage prototyping

Criterion 4: Commercialization Success

Requirement: A proven track record of taking new technologies to market with a high rate of success

Criterion 5: Application Diversity

Requirement: The development of technologies that serve multiple purposes and can be embraced by multiple user types

Decision Support Scorecard: Visionary Innovation

Decision Support Scorecard for Technology Innovation Leadership Award (Illustrative): VISIONARY Innovation

<i>Measurement of 1–10 (1 = poor; 10 = excellent)</i>	Award Criteria					
Visionary Innovation	Unmet Needs	Use of Mega Trends	Pioneering Best Practices	Blue Ocean Strategy	Aspirational Ideals	Weighted Rating
Relative Weight (%)	20%	20%	20%	20%	20%	100%
Humavox	9.0	9.5	9.0	9.0	9.0	9.1
Company2	8.0	8.0	8.0	7.5	7.5	7.8
Company3	7.5	7.0	7.5	7.0	7.0	7.2

Criterion 1: Unmet Needs

Requirement: A clear understanding of customers’ desired outcomes, the products that currently help them achieve those outcomes, and where key gaps may exist

Criterion 2: Use of Mega Trends

Requirement: Ability to incorporate long-range, macro-level scenarios into strategic plans, thereby anticipating and preparing for multiple futures that could occur

Criterion 3: Pioneering Best Practices

Requirement: A nothing-ventured-nothing-gained approach to strategy implementation that results in processes, tools, or activities that generate a consistent and repeatable level of success.

Criterion 4: Blue Ocean Strategy

Requirement: Proven track record of creating new demand in an uncontested market space, rendering the competition obsolete

Criterion 5: Aspirational Ideals

Requirement: A willingness to look beyond the simple goal of generating a profit to embrace a more powerful ideal of bringing greater value to customers or the planet

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best in class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages almost 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from 31 offices on six continents. To join our Growth Partnership, please visit <http://www.frost.com>.